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PAPERS
IN
MANUFACTURES.

In Page 109, of the 28th Volume of the Society's Transactions, will be seen a Communication from Mr. EDWARD SMITH, of Brentwood, on manufacturing a variety of Articles from the Fibres of the common Nettle, for which he has received their SILVER MEDAL; he has since, with great attention and laudable Industry, extended his Experiments on this Subject, and, during the last Session, produced to the Society Specimens of Cloth and Cordage made from the Nettle, which appear to possess great Strength and Durability. The Society have, therefore, this Session, voted to him their SILVER ISIS MEDAL. The following Communication was received from him, and Specimens of the Cordage and Cloth made by him from Nettles, are preserved in the Society's Repository.

ESTEEMED FRIEND,

I RECEIVED thy kind favour of the 23d instant, by the contents of which I am much obliged, and being impressed
by

by the consideration of the vast importance the introduction of a new substance of productive labour would be of to the community of this manufacturing country, particularly as affording a new source of industry to the increased numerous poor of both sexes, in truth, so operated on my mind, as to create a great unwillingness to suffer any exertions consonant with my limited powers, from total disadvantages, to lay dormant : I am, therefore, very desirous by unremitted endeavours to be instrumental in disseminating the knowledge of, and the means of bringing into use, so valuable a spontaneous production as the common nettle substance, under the sanction and through the medium of the enlightened Society of Arts, &c. These considerations, aided by the hope of obtaining their further approbation, have stimulated me to persevere in my attempts to contribute all in my power towards the advancement of so desirable and beneficial an object, in the expectation that when all the different fabrics which that substance is capable of being converted into, are produced, it may have a greater tendency towards encouraging others to embark in a manufactory thereof, than volumes written on the subject. With these sentiments, I am induced to trouble thee farther, in requesting thou wilt be so kind to favour me by laying before the Society the different specimens of manufactory from the nettle substance, which I have at present in readiness, and which will be sent to thee by the Brentwood coach, which inns at the Blue Boar, Aldgate, and I expect will be delivered soon after the receipt of this. The cordage Nos. 1 and 2, is affirmed by the cord-spinner to be of equal strength to that made from hemp. The cloth No. 1, is rough from the loom ; No. 2, the same fabric half bleached ; and No. 3, which I ordered to be *Huckaback*, also is only half bleached for want of sufficient time for the process. The
quality

quality of the cloth hath suffered throughout, by the negligence or willfulness of the manufacturer, and is principally owing to the raw material having been only passed through such heckles as are used for the coarse part of the hemp manufactory;—other necessary operations were omitted, in consequence of my instructions not being attended to by the persons into whose care it was entrusted. He resides in the country, at a great distance, and his capability and integrity proved greatly inferior to the opinions I had entertained of him; and it now appears his practice is confined to the coarser part of the hemp manufactory. It was my intention to have produced with the above a pair of stockings, manufactured on the principle of cotton, and also a specimen of fine cloth on the same principle, with a view to shew the great extent of contrast; but, on application to a cotton spinner, I found the quantity of material I had in a state of preparation suitable was not sufficient for the operations of carding; in consequence I am obliged to postpone my designs till I am enabled to prepare a sufficiency. Greatly desirous of contributing to the accomplishment of the object in view, and sensible how much the sanction and approbation of the Society would tend to promote it, I hope they will consider my continued exertions worthy their farther attention. Anticipating their approbation, I remain,

Very respectfully,

Thy Assured Friend,

EDWARD SMITH.

Brentwood, the 26th of 3d Month, 1811.

TO C. TAYLOR, M. D. SEC.

TEN GUINEAS were this Session voted to Mr. JOHN ROBERTSON, *St. Mary's Wind, Edinburgh, for an Improvement in Machinery for Weaving Tartan or Plaid Hose. The following Communication was received from him, an Explanatory Engraving is annexed, and a Model of the Machine, and Specimen of the Work, is preserved in the Society's Repository.*

MUCH RESPECTED SIR,

THE highly honourable and useful Society for the Encouragement of Arts, Manufactures and Commerce, with which you are officially connected; and from a former instance of their and your attention to me, emboldens me again to call their discriminating taste and judgment to the inclosed draught and description of a machine, for the more expeditious working of Tartan Hose on the stocking frame, as also one done by the invention;—an article essentially necessary in the *Highland garb*, the dress of the *Conquerors of Egypt*, and the more than *match for French Invincibles!* Tartan, or diamond hose, from the present tedious manner of working so many threads, (eleven in number) and although the hose are not much above one half of the length of common stockings, yet they are rated to the workman at the price of two pair of hose of the same gauge on the same frame; therefore it gives me much pleasure to send you an invention that will facilitate the operation, and save more than half of the time formerly taken; consequently it will prove of great advantage to that part of the community of Scotland who use that dress;
besides,

Mr. John Robertson's Machine for weaving Tartan.

Fig: 2.

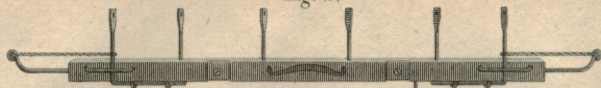


Fig: 3.

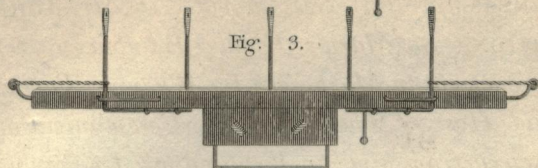
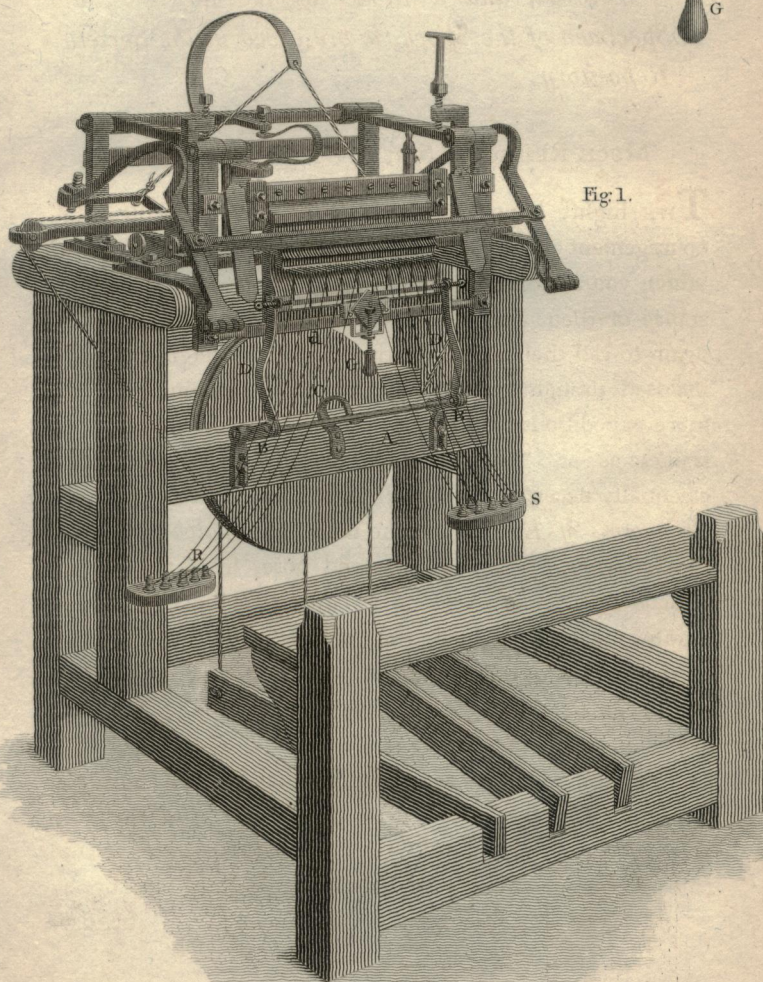


Fig: 4.



Fig: 1.



besides, the machine will also prove of use in fancy work of different designs, for by it the diamond may be made from a quarter of an inch to two or more inches square, and of any guage of a frame, although the pattern hose is coarse, it being done on a twenty-four inch guage frame that I put the machine to.

I have only further to observe, as will appear upon the Society's investigation, that the invention is truly simple, and the expence of the machine, independent of the stocking-frame, will cost but a mere trifle. Your communicating to me the result of this application, will oblige,

Much respected Sir,

Your most obedient,

and very humble servant,

JOHN ROBERTSON.

St. Mary's Wynd, Edinburgh,

March 8th, 1809.

TO C. TAYLOR, M. D. SEC.

CERTIFICATES.

WE have examined Mr. John Robertson's invention, and we are happy in declaring that it deserves encouragement, as the machine in operation will save a great deal of time in making tartan hose.

JAMES BAIRD, Hosier.

DAVID YAIR.

WILLIAM VAIR, Stocking-frame Smith.

Edinburgh, May 6th, 1809.

Explanation

Explanation of the Drawings of Mr. Robertson's Machine, for Weaving the Tartan Plaid. Plate 3.

THE tartan hose are woven in the same manner as other hosiery, on a stocking-frame, except that threads of two different colours are employed, and these are disposed in diamonds, of the two colours, disposed alternately. The mode of operation of the stocking-frame is difficult to describe in words, though it may be readily comprehended, from an attentive inspection of the machine in action; on this account the Society deem it unnecessary to enlarge the following account of Mr. Robertson's invention, by a minute description of the stocking-frame delineated in the plate, especially as the majority of persons who will feel an interest in this communication, are already perfectly acquainted with its mechanism.

The ordinary method of weaving the tartan in the stocking-frame is to have as many different threads as there are diamonds in the width of the hose to be woven. These (eleven in number) are laid one by one, the different colours alternately, upon the needles of the frame; and then by the motion of the jacks and snikers, the threads are knitted upon the needles, and formed into the hose, the colour changing at the places where the different coloured threads were laid on the needles; as the work proceeds, the number of needles, one of the coloured threads is laid over, must be increased, and the other colours diminished in the same proportion, to give the figure of diamonds of the different colours; all these movements are effected with ease by the machine delineated in plate 3, where fig. 1, shows its application to the

the stocking-frame, and the other figures the developement of its parts; it is fixed to the fore rafter A of the stocking-frame by screw bolts which admit of its adjustment; the pieces thus fixed support the pivots of two short arms BB, connected by a cross-bar, upon which the spring C operates, to sustain the weight of the machine; DD are two arms joined to BB extending to the facing-bar d of the frame, and connected by a cross-bar E, in which are two sliders, shewn separately in figs. 2 and 3, moving in grooves of the bar E; the slider, fig. 2, has 6 guides fixed in it; they are pieces of wire, with an eye through each to receive the thread; 4 of these 6 guides are fixed in the bar, but the two end ones are fitted to slide under wire eyes or staples, fixed in the underside of the slider: they have a constant tendency towards the ends of the sliders, by small spiral springs shewn in the figure; the slider, fig. 3, has 5 guides or needles, 3 fixed into it, and the two outside ones moveable as before-mentioned. The different coloured threads are put through the eyes of the guides, one colour to the top slider, and the other to the lower, and as the work proceeds, are drawn off the small bobbins RS, arranged on the sides of the frames; by this means 11 threads are presented to the needles at once, and the sliders, figs. 2 and 3, being moved endways by hand, lay the different coloured threads along upon such a number of needles as their motion allows; the number of needles, as before-mentioned, must be increased one needle, for the threads of one colour, and diminished as much to the other; at every stroke of the machine, to produce this effect, the quantity of motion allowed to the sliders, must be altered the space of one needle every time; thus, the upper one, for instance, must at first slide the whole breadth of the diamond, except one needle, and the lower slides
only

only the space of one needle; in this position the diamonds produced by the threads of the upper slider will be at their greatest breadth, while those of the lower are only the points of the diamonds; every succeeding stroke the machine makes, the upper slide must have its motion diminished the space of one needle, and the lower one increased in the same degree, because the diamonds produced by one are widening, and the others narrowing; this continues till the lower slide moves the whole breadth of the diamond, as the upper one did at first setting out, and then the action is reversed: the upper one being on the increase till it gets to the full width again, when a diamond will have been completed. This variable motion of the two sliders is regulated by a square, shewn in fig. 4, exactly the same size and figure as the diamond; this is situated as shewn in fig. 1, and the sliders have pieces projecting from them, which stop against the edges of the square, which is moved every course, by turning the screw G, one turn in its socket, which is connected with the bar E. By this means the reader will see that the movement of the sliders will be as above stated; the screw must have twelve threads per inch for a stocking-frame of a twenty-four inch guage, then there will be twenty-two leads, or forty-two needles, in the widest part of each diamond, which will be $1\frac{2}{3}$ across; for a thirty inch guage, the screw must have fifteen threads per inch. The outside guide of both sliders do not partake of the motion of the sliders, because they are to produce the selvages of the hose; making half diamonds, which become whole ones when the stocking is sewed; these guides, as at first explained, are not fixed to the sliders, but have a sliding movement endways, the springs always drawing them out, and they are stopped by the ends of two screws, attached

tached to the ends of the bar E, as may be seen in fig. 1 ; these screws being turned, will adjust the selvage needles, as is required for the breadth of the hose, and for narrowing it when it comes to the small part of the leg. By this machine, the whole of eleven threads may be laid upon the needles, in the same time that two could be done in the common way, and without necessity of counting the needle, to increase and diminish the different coloured diamonds.

